

WHAT IS CLAIMED IS:

- 1 1. A method for extracting demographic information, comprising:
2 initiating a dialog between a contact and a call handling system;
3 selecting a set of demographic characteristics;
4 assigning a set of acoustic confidence scores to the demographic
5 characteristics;
6 assigning a set of substantive confidence scores to the demographic
7 characteristics;
8 combining the acoustic and substantive confidence scores for each of the
9 demographic characteristics; and
10 tailoring information presented to the contact using the set of combined
11 confidence scores.
- 1 2. The method of claim 1, wherein assigning substantive confidence scores
2 includes:
3 presenting the contact with a first substantive dialog;
4 collecting a set of responses to the first substantive dialog from the contact;
5 comparing the contact's responses to a predefined body of responses
6 associated with the set of demographic characteristics; and
7 assigning a first set of substantive confidence scores to the demographic
8 characteristics.
- 1 3. The method of claim 2, wherein presenting includes:
2 continuing to present the contact with the substantive dialog until one of the
3 substantive dialog confidence score reaches a predetermined value.

- 1 4. The method of claim 2, wherein presenting includes:
2 continuing to present the contact with the substantive dialog until a
3 predetermined time period has expired.
- 1 5. The method of claim 2, wherein presenting includes:
2 presenting the substantive dialog to the contact when the contact is placed on
3 hold.
- 1 6. The method of claim 2, wherein assigning substantive confidence scores
2 includes:
3 presenting the contact with a second substantive dialog, in response to a
4 request from the call handling system;
5 collecting a set of responses to the second substantive dialog from the contact;
6 comparing the contact's responses to the predefined body of responses
7 associated with the set of demographic characteristics; and
8 assigning a second set of substantive confidence scores to the demographic
9 characteristics.
- 1 7. The method of claim 1, wherein assigning substantive confidence scores
2 includes:
3 presenting the contact with a probing dialog;
4 collecting a set of responses to the probing dialog from the contact;
5 comparing the contact's responses to a predefined body of probing dialog
6 responses associated with the set of demographic characteristics; and
7 assigning a set of probing dialog confidence scores to the demographic
8 characteristics.

1 8. The method of claim 7, wherein presenting includes:

2 asking the contact a set of questions associated with the demographic
3 characteristics.

1 9. The method of claim 1, wherein assigning substantive confidence scores
2 includes:

3 presenting the contact with a set of multiple choice questions;
4 collecting a set of responses to the multiple choice questions from the contact;
5 comparing the contact's responses to a predefined body of multiple choice
6 question responses associated with the set of demographic characteristics; and
7 assigning a set of multiple choice confidence scores to the demographic
8 characteristics.

1 10. The method of claim 9, wherein presenting includes:

2 presenting the contact with multiple choice questions associated with the
3 demographic characteristics.

1 11. The method of claim 1, wherein assigning acoustic confidence scores includes:

2 extracting an acoustic feature from the contact's speech signal; and
3 comparing the feature to a predefined body of speech signal features associated
4 with the set of demographic characteristics.

1 12. The method of claim 1, wherein combining includes:

2 weighting the confidence scores using ground truth data.

1 13. The method of claim 1, wherein weighting includes:
 2 adjusting a first confidence scores weight for a given demographic
 3 characteristic if the first confidence score differs from a second confidence score for
 4 that given demographic characteristic by a predetermined amount.

1 14. The method of claim 1, wherein combining includes:
 2 multiplying together the confidence scores for each demographic
 3 characteristic.

1 15. The method of claim 1, wherein combining includes:
 2 combining the confidence scores for each demographic characteristic
 3 according to the following formula:
 4
$$S(C_i) = \sum_{j=1}^N r_j p_{ij}$$
 (where N is a total number of classifiers, Ci is the i'th
 5 demographic characteristic, and Pij is a confidence score for Ci generated by
 6 Classifier j, and rj is trained weights);

1 16. The method of claim 1, wherein combining includes:
 2 combining the confidence scores from each classifier for each demographic
 3 characteristic according to the following formula:

4
$$S(C_i) = \prod_{j=1}^N p_{ij}^{r_j}$$
 (where N is a total number of classifiers, Ci is the i'th
 5 demographic characteristic, and Pij is a confidence score for Ci generated by
 6 Classifier j, and rj is trained weights);

1 17. The method of claim 1, wherein combining includes:

2 using a neural net to combine the confidence scores for each demographic
3 characteristic.

1 18. The method of claim 17, wherein the neural net is a Multiple Layer Perception
2 (MLP) network.

1 19. The method of claim 1, wherein tailoring includes:
2 identifying a sub-set of the demographic characteristics having combined
3 confidence scores exceeding a predetermined set of thresholds; and
4 presenting the contact with information specifically directed to contacts having
5 the sub-set of demographic characteristics.

1 20. The method of claim 19, wherein the predetermined threshold is equal to a
2 highest combined confidence score.

1 21. The method of claim 1, wherein the demographic characteristics include
2 gender, age, accent, and stress level.

1 22. A method for extracting demographic information, comprising:
2 initiating a dialog between a contact and a call handling system;
3 selecting a set of demographic characteristics;
4 assigning a set of acoustic confidence scores to the demographic
5 characteristics;
6 assigning a set of substantive confidence scores to the demographic
7 characteristics;

8 combining the acoustic and substantive confidence scores for each of the
9 demographic characteristics;
10 tailoring information presented to the contact using the set of combined
11 confidence scores;
12 presenting the contact with a probing dialog;
13 collecting a set of responses to the probing dialog from the contact;
14 comparing the contact's responses to a predefined body of probing dialog
15 responses associated with the set of demographic characteristics;
16 assigning a set of probing dialog confidence scores to the demographic
17 characteristics;
18 presenting the contact with a set of multiple choice questions;
19 collecting a set of responses to the multiple choice questions from the contact;
20 comparing the contact's responses to a predefined body of multiple choice
21 question responses associated with the set of demographic characteristics; and
22 assigning a set of multiple choice confidence scores to the demographic
23 characteristics.

1 23. A computer-usable medium embodying computer program code for
2 commanding a computer to extract demographic information, comprising:
3 initiating a dialog between a contact and a call handling system;
4 selecting a set of demographic characteristics;
5 assigning a set of acoustic confidence scores to the demographic
6 characteristics;
7 assigning a set of substantive confidence scores to the demographic
8 characteristics;

9 combining the acoustic and substantive confidence scores for each of the
10 demographic characteristics; and
11 tailoring information presented to the contact using the set of combined
12 confidence scores.

1 24. A system for extracting demographic information, comprising a:
2 means for initiating a dialog between a contact and a call handling system;
3 means for selecting a set of demographic characteristics;
4 means for assigning a set of acoustic confidence scores to the demographic
5 characteristics;
6 means for assigning a set of substantive confidence scores to the demographic
7 characteristics;
8 means for combining the acoustic and substantive confidence scores for each
9 of the demographic characteristics; and
10 means for tailoring information presented to the contact using the set of
11 combined confidence scores.

1 25. A system for extracting demographic information, comprising:
2 an Interactive Voice Response module for initiating a dialog between a contact
3 and a call handling system, and selecting a set of demographic characteristics;
4 an acoustic classifier for assigning a set of acoustic confidence scores to the
5 demographic characteristics;
6 a substantive classifier for assigning a set of substantive confidence scores to
7 the demographic characteristics; and
8 a data combiner for combining the acoustic and substantive confidence scores
9 for each of the demographic characteristics; and

10 wherein the Interactive Voice Response module further tailors information
11 presented to the contact using the set of combined confidence scores.

1 26. The system of claim 25, wherein the substantive classifier includes:
2 a probing dialog classifier for assigning a set of probing dialog confidence
3 scores to the demographic characteristics; and
4 a multiple choice classifier for assigning a set of multiple choice confidence
5 scores to the demographic characteristics.
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